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Attorney's Docket No.: 3364P010

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application for:

Wan-uk Choi, et al.

Application No.: 09/265,601

Filed: March 10, 1999

For: **ACTIVE NEGATIVE MATERIAL FOR  
LITHIUM SECONDARY BATTERY,  
METHOD OF PREPARING THE SAME  
AND LITHIUM SECONDARY  
BATTERY USING THE SAME**

Examiner: Tracy Mae Dove

Art Group: 1745

Honorable Commissioner For Patents  
Washington, D.C. 20231

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DECLARATION PURSUANT TO 37 C.F.R. §1.132

I, Wan-uk Choi, hereby declare that:

1. I am a citizen of Korea.
2. I currently reside at Kongwoo, Apt. 2-401, Younghwa-dong, Changan-ku, Suwon-si, Kyungki-do, Korea.
3. I am currently an employce at Samsung Display Devices Co., Ltd. ("Samsung").
4. I have been an employee of Samsung since March 1, 1997.
5. My current title at Samsung is senior researcher.
6. I am a co-inventor of the above-identified patent application.
7. I conducted diffraction peak intensity measurements of material made in accordance with the techniques disclosed in the above-identified patent application. The measurements were made with X'pert pro (Phillips Co.) using light having a wavelength of 1.5418A(CuK $\alpha$ ) along the (002), (110) and other planes. We measured X-ray diffraction

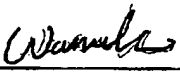
intensity of the carbon materials with an Si internal standard. We were able to calibrate the position of carbon peaks and ascertain repeatability of experiments exactly with the Si internal standard peak. We fitted the function curve well, and calculated the integrated intensity of (110) and (002) peaks using software installed in an X-ray diffractometer (X'pert pro). From the results, we calculated the intensity ratio,  $I(110)/I(002)$ .

8. Attached as Exhibit 1 are X-ray diffraction graphs, showing diffraction intensity peaks, that were generated according to the methodology described in numbered paragraph 7. Based on the attached graphs, it can be seen that material made in accordance with the techniques disclosed in the above-identified application has an intensity ratio  $I(110)/I(002)$  less than 0.2.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-identified application or any patent issued thereon.

Respectfully submitted,

Dated: April 26, 2002

  
\_\_\_\_\_  
Wan-uk Choi

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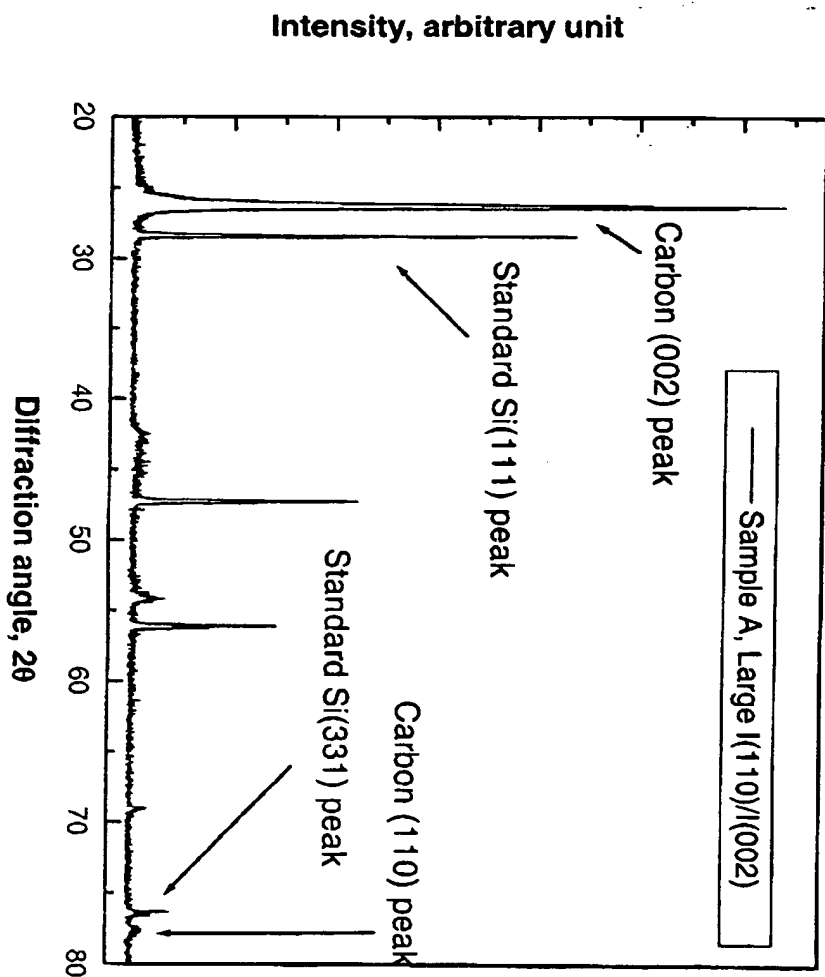


Fig. 1: X-ray Diffraction pattern of Carbon material which has a large  $I(110)/I(002)$  value with Si internal standard.

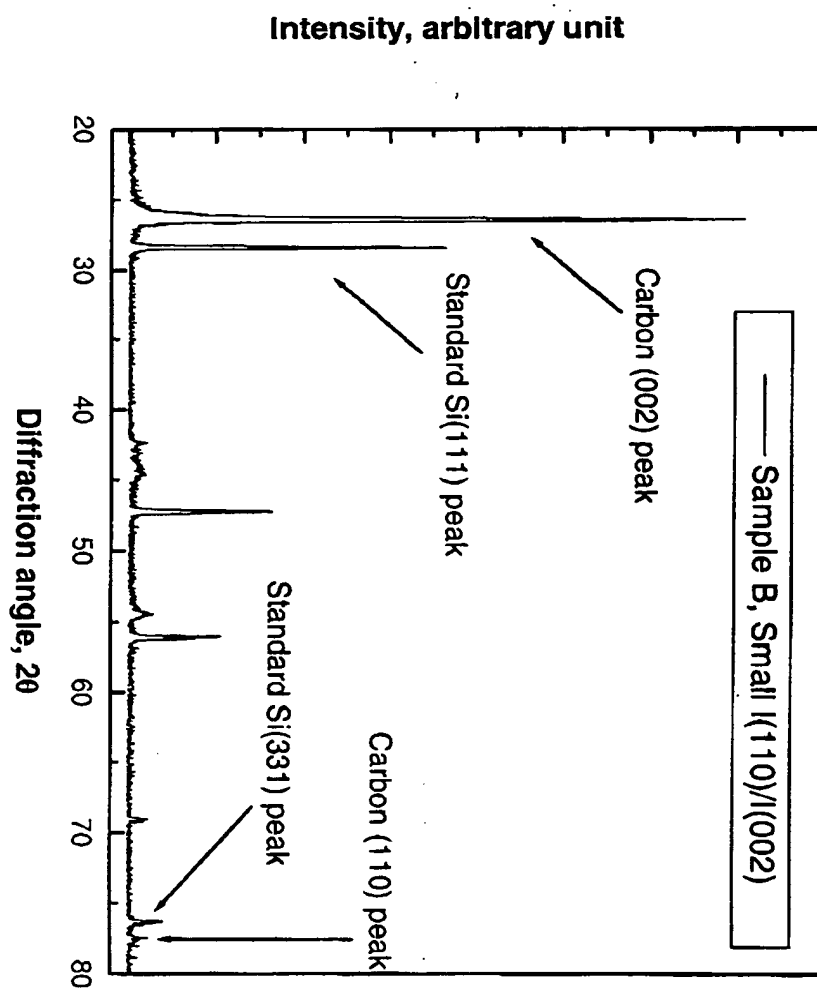


Fig. 2: X-ray Diffraction pattern of Carbon material which has a small  $I(110)/I(002)$  value with Si internal standard.



### Experimental procedure

1. Two carbon samples (Carbon A and B) were prepared by heat-treating at 2400 °C and 2800 °C, respectively.
2. Si powder (99.99%, 325 mesh) was added to the carbon sample to obtain a sample for X-ray diffraction analysis. The X-ray diffraction pattern data of the sample was measured using an X'pert pro diffractometer by Philips Co. (The Si powder was used as an internal standard).
3. Using the measured data and X-ray diffractometer software, an X-ray diffraction peak intensity  $I(110)$  at a (110) plane and a peak intensity  $I(002)$  at a (002) plane were obtained.
4. An X-ray diffraction peak intensity ratio of  $I(110)/I(002)$  was calculated using the obtained intensity values.

Table: Integral intensity and Li intercalation data of carbons manufactured under different conditions.

Sample	Peak position	FWHM	Integral Intensity	$I(110)/I(002)$	Li intercalation Capacity
Carbon A	26.3°	0.39°	114.9	0.021	328mAh/g
	77.3°	0.12°	2.4		
Carbon B	26.3°	0.36°	330.0	0.006	345mAh/g
	77.3°	0.10°	2.1		

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